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Methods for fumigating soil using acrolein

Description of Technology: The present invention provides for methods for fumigating soil containing deleterious organisms such as nematodes. The methods utilize an effective amount of acrolein which when added to the soil will control the organisms but will not exhibit phytotoxicity towards the existing or future plant life and an effective amount of a detoxification compound such as for example: sulfites, bisulfites, ammonia or ammonium compounds.

Patent Listing:

1. **US Patent No.** 5,866,614, February 2, 1999, "Methods for fumigating soil using acrolein."
   http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&co1=AND&d=PTXT&s1=5,866,614.PN.&OS=PN/5,866,614&RS=PN/5,866,614

Market Potential: Fungi, bacteria, nematodes, viruses and insects can cause problems in soil designated for growing. This soil contamination will lead to the dying off of plants, growth rate problems, root problems and production decrease. The need for soil disinfestation is thus recognized as a manifest one.

Due to the United States' participation in the Montreal Protocol, compounds that have a detrimental effect on the ozone layer will be banned as of Jan. 1, 2001. These compounds include chlorinated fluorocarbons (CFC's) and methyl bromide. The 150 countries party to the United National Montreal Protocol are acting globally on what is pledged to be a complete phase out of methyl bromide and CFC's.

To that end, an alternative fumigant that possesses attributes similar to methyl bromide (no toxic residue, efficacy, and ease of use/economics) must be found. This fumigant should leave no toxic soil residue, should be biodegradable, and should exhibit efficacy against a wide variety of soil pathogens, as well as insects and nematodes.

From an environmental point of view, acrolein is a good biocide because it is effective, detoxified readily and inexpensively, and is non-persistent. Water solutions of acrolein are readily and conveniently neutralized for disposal with sodium bisulfite. This reaction produces a non-toxic water-soluble salt. Acrolein is also neutralized by reacting with materials present in natural waters and is therefore self-neutralizing. Also, one major advantage over methyl bromide is that there is no residue left in the soil other than normal carbohydrate residuals that can be readily assimilated by plants and other organisms.

Benefits:

- Complies with regulations for compounds that have detrimental effects on the ozone layer.
- Acrolein is effective, detoxified readily, and inexpensive.
- Acrolein is self-neutralizing.
- No residue left in the soil, as methyl bromide leaves residue.

Applications:

- Fumigant

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